

GOVERNMENT OF INDIA  
METEOROLOGICAL DEPARTMENT

# INDIA WEATHER REVIEW, 1946

## ANNUAL SUMMARY

### PART B

## SNOWFALL

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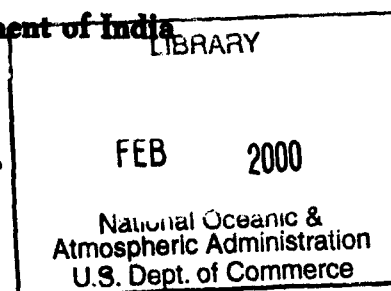
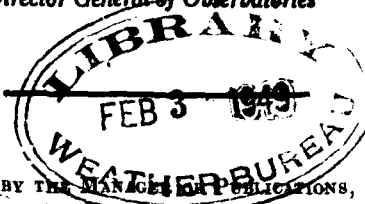
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# **National Oceanic and Atmospheric Administration**

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# INDIA WEATHER REVIEW, 1946.

## ANNUAL SUMMARY.

### PART B.

#### SNOWFALL.

This part contains a summary of the reports of snowfall in the mountain regions to the north and northwest of India. These reports are collected by local officers from the local residents, headmen of villages or from travellers who have passed through the region and are then transmitted to this office.

The amount of snowfall is usually measured by finding the depth of undisturbed snow lying on the ground. The measurements are given in feet and inches. At places provided with raingauges the snow collected in the gauge is melted and measured as rain. This is indicated in the text and the measurements are given in inches and cents.

#### Cold Weather Period, January & February.

##### I.—AFGHANISTAN.

*Kabul.*—Snow fell on the ground on four days in January and on five days in February aggregating to depths of 13½" and 4.4" respectively. The falls were below the average in January and very much below the average in February. The high peaks of the Hindukush and Paghman hills were thickly covered with snow throughout the period. The Shibar pass was closed to traffic for a short period in January. At the end of the period, there were no snow accumulations on the ground, but thin layers existed in the crevices of the surrounding hills. The weather was milder than usual in both the months.

##### II.—BALUCHISTAN.

*Quetta.*—During January snow fell on two days at the station and on three days on the neighbouring high peaks. The depth of snow was ½" at the station. In February there was one light fall on the hills. The falls during the seasons were below normal.

##### III.—NORTH-WEST FRONTIER PROVINCE.

*Hazara.*—Snowfall was reported on nine days in January and on eight days in February. The falls during and the accumulations at the end of each month are given below. These were below the average.

Locality.	January.		February.	
	Falls.	Accumulations.	Falls.	Accumulations.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Thandiani . . . . .	2 1	3 0	1 6	2 0
Dagri . . . . .	3 0	3 6	2 4	3 0
Birangali . . . . .	0 11	0 6	0 8½	..
Sattu . . . . .	1 3	1 6	1 4	1 4
Kalabagh . . . . .	1 6	0 6	3 4	1 9
Dungagali . . . . .	2 7	1 0	2 3½	2 0
Jared . . . . .	5 2	0 4	0 6	..
Kagan . . . . .	4 0	3 0	1 0	1 0
Pludran . . . . .	7 0	4 0	1 0	1 0
Narang . . . . .	8 0	4 0	1 6	1 6
Kund . . . . .	4 6	5 0	3 2	1 6
Sundi . . . . .	4 6	5 0	2 8	2 0
Jachha . . . . .	7 0	8 0	4 0	4 0

*Malakand.*—Snow fell on eight days in January and six days in February. The accumulations of snow on the surrounding high peaks at the end of January were estimated to be as follows. These were slightly below the average.

Locality.	January.
	Ft.
Lowarai . . . . .	28
Bashkar . . . . .	29
Mankial . . . . .	30
Ilam and Dosara . . . . .	15
Hindu Raj . . . . .	12

*Kohat.*—Except for a few light falls in Orkazai Tirah, there was no snowfall in January. Snow fell in February at Fort Lockhart and when melted and measured as rain amounted to 41 cents. These were much less than the usual falls for the season.

*Khyber Agency.*—Snow fell on one day in January in Maidan Bagh and on the hills in Tirah. In February it snowed to depths of 1½" to 3" in the Tirah valley and on the hills of Tirah. There was no snowfall in Landikotal during the period. The falls were estimated to be below the average.

*North Waziristan.*—The report received showed that snowfall during the period was below the average.

##### IV.—KASHMIR.

*Skardu.*—In January snow fell on two days at the station proper. Mixed rain and snow fell on two days in February. At the end of the period, there were no accumulations at the station proper; on the surrounding passes, however, about two feet of accumulations existed at the end of each of the months. The falls and accumulations were below normal.

*Dras.*—Snow fell on thirteen days in January and on six days in February. The falls were below normal in both the months. The accumulations of snow at Dras proper amounted to 22 inches at the end of January and to 25 inches at the end of February. On the Mushkoo hill the accumulations were reported to be 3 ft. 4 inches and 3 ft. 10 inches respectively at the end of the two months and these were below normal. All the hills surrounding Dras were totally covered

with snow down to the ground and the Zojilla pass was closed to traffic throughout the period.

*Srinagar.*—There were five light falls in January and nine light to moderate falls in February on the surrounding Pir Panjal mountain range. The depth of these falls varied from half a foot to one foot in January and one foot to four ft. in February. There were five light falls in January and three in February, in the valley. The accumulations on the Pir Panjal mountain range were about three feet at the end of January.

*Kargil.*—Snow fell on eleven days in January and six days in February. The snow melted and measured as rain amounted to 1.15 inches and 0.30 inches in the two months. The accumulations on the surrounding high peaks amounted approximately to 7 ft. in January and 9 ft. in February. These were above normal.

*Sonemarg.*—There were fourteen snowfalls in January and eleven in February. The snow when melted and measured as rain amounted to 8.27" and 5.65" respectively in the two months. The falls were about normal in both the months. The accumulations at Sonemarg proper at the end of each of the two months were 3' 10" and 5' respectively while those on the Zojilla pass were reported to be about 7 ft. at the end of February. The accumulations at the end of February were below normal.

*Leh.*—Snow fell at the station on four days in January and on two days in February. The falls amounted to about 3 inches in January and 2 inches in February. The falls were below the average in both the months. There were about 3 to 4 ft. of accumulations on the passes at the end of January and 4 to 5 ft. at the end of February. The snow line was at about 15,000 ft. in January and 13,500 ft. in February.

#### V.—THE PUNJAB.

*Rawalpindi.*—Snow fell in Murree on one day in January and on three days in February to total depths of 3" and 1.9" respectively.

*Chamba.*—Chamba Range:—There was only one snowfall in January and it amounted to 2". The snowline descended to about 3,000 ft. The falls were very much below normal. According to reports this was the first time in the history of Chamba when only one snowfall occurred during January.

*Dalhousie Range.*—Snowfall occurred on one day in January and on three days in February to total depths of 3' 9" and 1' 10" respectively. The snowline descended to heights of 3,000 ft. in January and 5,000 ft. in February. By the end of January, snow had melted away on the sunny sides of the passes but in the depressions, the accumulations were about 4 ft. At the end of February the accumulations on the Chavari pass were about 2 ft. while in the depressions they amounted to a depth of 4 ft. The falls and accumulations were below the average.

*Pangi Range.*—At Kilar (8,400 ft.) snow fell on four days in January to a total depth of 1' 2". The falls were reported to be much below normal. The snowline descended to a height of 7,500 ft. during each snowstorm. At the end of January there were no accumulations at the station proper. No report was received for the month of February.

*Kulu (Kangra District).*—Snow fell to average depths of 6 ft. and 1 ft. respectively in January and February on the high ranges of the Himalayas in the Kangra and Palampur tahsils and in the Kulu sub-division. The snowline descended to about 1,000 ft. in January and 5,200 ft. in February on the Himalayan ranges. The falls were below normal in both the months. Snow had accumulated to depths of 10 ft. in January and 6½ ft. in February on the high ranges. The accumulations on the higher passes were 1½ ft. to 5 ft. at the end of January and 4 to 17 ft. at the end of February. The falls and accumulations were below the average.

*Kilba Hills (Simla District).*—There were three light falls of snow in the second half of January. The snowline came down to 6,000 ft. In February it snowed during the later half of the month giving a total depth of 1' 8" at Sangla and the snowline descended to 5,500 ft. All the passes were blocked. For the season as a whole, the snowfall is reported to be below the average.

#### VI.—THE UNITED PROVINCES.

*Almora.*—The falls and accumulations during the period were as shown below:—

Locality.	January.	February.
	Ft.	Ft.
<i>Falls.</i>		
Malla Danpur . . . . .	2	4½
Malla Darma . . . . .	1	2½
Chaudans . . . . .	1½	13½
Byans . . . . .	Nil	..
Malla Johar . . . . .	..	..
<i>Accumulations.</i>		
Pindar Valley . . . . .	61	60
Nandakhat . . . . .	61	60
Sundar Dhunga . . . . .	61	60
Bankatia . . . . .	77	75
Masurleg . . . . .	9	13½
Lipu . . . . .	6	..
Lampia . . . . .	9	..
Nubedhura . . . . .	..	27

The falls were below normal and the accumulations at the end of the period nearly normal.

*Garhwal.*—Snow fell on two days in January and on four days in February on the higher peaks. The depth of snow varied from 1 to 2 ft. in January and 1 inch to 1 foot in February. The falls were much below the average during the period. The snowline descended to 6,500 ft. in January and 6,000 ft. in February. There were no accumulations at the end of January but at the end of February, about ½ foot of snow existed on the well-known higher passes of the district.

*Naini Tal.*—No information was received for January. Snow fell on one day in February to a depth of 2 inches. The falls were much below normal.

#### VII.—ASSAM.

*Kamrup.*—The available reports show that some snowfall occurred on the Thumsangla and Oanthaia peaks, and that some of the roads were closed to traffic. The falls and accumulations are reported to be below normal.

**Baliapara Frontier Tract.**—Snowfall was in great defect both in the lower and upper ranges during the period. The lower ranges, viz. Manda La, Bonpu La and the Bomdi La, were practically free of snow except for two short spells, once during the middle of January and again in the 3rd week of February, when there was about 6 inch of snow on the passes. In the upper ranges, viz. Se La, Orka La, Punsum La, and Riso La, snowfall was scattered and light till the end of February. The pass over the Se La which is normally

blocked by snow for about 30 days during January and February remained open this year for traffic throughout the period.

**Sadiya Frontier Tract.**—There was practically no snowfall in the Abor hills. In the Mishmi hills, two light falls were observed during the middle of February to a total depth of 14 in. On the peak opposite to Theroliang Camp (8,000 ft.) some snow was noticed. Falls were below the average.

### Hot Weather Period, March to May.

#### I.—AFGHANISTAN.

**Kabul.**—There was no snowfall in Afghanistan after the 3rd May 1946. The snow accumulations on the Paghman and Hindukush ranges were below normal and were mostly confined to the tops and crevices of the mountains. The Shibar pass on the north was clear of snow. The accumulations were reported to be below normal. The winter was considered to be unusually mild and there was anxiety among the local people that water in the mountain streams might not be sufficient for irrigational purposes.

#### II.—BALUCHISTAN.

**Quetta.**—There was no snowfall during the period.

#### III.—NORTH-WEST FRONTIER PROVINCE.

**Hazara.**—The following table gives the total amounts of snowfall during and the accumulations at the end of March at various localities in the district. The falls and accumulations were below normal. At heights between 7,000 ft. and 17,500 ft. the accumulations at the end of May varied from 1½ ft. to 6½ ft.

Locality.	Falls.		Accumulations.	
	Ft.	In.	Ft.	In.
Thandiani (8,800 ft.)	1	0	0	0
Dagri	1	6	0	6
Birangali (6,600 ft.)	0	6	..	..
Sattu	1	0	..	..
Kalabagh (7,900 ft.)	4	6	0	9
Dungagali (8,000 ft.)	4	10	1	6
Malkandi	0	6	..	..
Jared (5,000 ft.)	0	9	..	..
Kagan (7,000 ft.)	1	0	1	0
Pludran (7,500 ft.)	1	0	1	0
Narang (8,000 ft.)	2	0	2	0
Jachha	8	6	3	0
Sundi	5	6	1	0
Kund	5	2	..	..

#### Dir, Swat and Chitral—

**Drosh.**—Light snow fell over the Lowarai and Madaglasht peaks extending to lower levels during May. The accumulations at the end of May were below normal.

**Chitral.**—There was no snowfall during April and May on the higher ranges and the accumulations that existed were reported to be much below normal.

**Malakand.**—Snow fell on five days in March to a total depth of 2½ ft. The falls were above average. There was no snowfall either in April or in May. The accumulations at the end of the months on the well-known peaks are given below. The accumulations at the end of May were below normal.

Locality.	March	April	May
	Ft.	Ft.	Ft.
Lowarai	27	12	4
Bashkar	41	14	7
Hindu Raj	34	4	..
Mankial	42	16	8
Ilam and Dosara	15	2	..

**Khyber Agency.**—Snow fell on one day in March to a depth of ½ inch in the Tirah valleys and 1 inch on the hills of Tirah. The accumulations at the end of March were reported to be two to four inches on the Morga hill. In Landikotal, there was no snowfall.

**Kurram.**—No reports were received for March and April. The accumulations at the end of May on the well-known peaks were—Sikaram peak 3½ inches, Badina peak 2½ inches, Zeran pass ¾ inch and Sikaram pass 1 inch. These were below normal.

**Kohat.**—The snowfall at Fort Lockhart during March when melted and measured as rain amounted to 15 cents. There were no falls in April and May.

**North Waziristan.**—There was little snowfall during April. There were no accumulations on the highest peaks of Shoidar and Preghal at the end of May.

#### IV.—KASHMIR.

**Skardu.**—There was one light snowfall in March and none in April and May. The accumulations on the surrounding high peaks were reported to be about one foot at the end of April. The accumulations on the surrounding high passes at the end of May were melting away. The falls and accumulations were much below the normal.

**Dras.**—Snow fell on twelve days in March and on two days in April. There was no snowfall in May. All the hills surrounding Dras were totally covered with snow during March and April. At Dras proper there were 34 inches of snow on the ground at the end of March but none at the end of May. The accumulations on the Mushkoo hill were 5 ft., 3 ft. 4 inches and 1 ft. respectively at the end of each of the three months and were generally below normal.

**Srinagar.**—Seven light to moderate falls of snow were observed on the surrounding Pir Panjal range in March. Six falls in April and four in May. The depth of the falls varied from ½ ft. to 1 ft. in March, 1 inch to about 4 inches in April and 1 inch to 3 inches in May. There were considerable accumulations of snow on the Pir Panjal mountain range at the end of April and May and in the Banihal pass in the Pir Panjal range. These were reported to vary from 2 to 4 ft.

at the end of March and 2 to 3½ ft. at the end of April. In May, the accumulations on the Pir Panjal range were between 2 ft. and 3 ft. Snowfall during the season was nearly normal.

*Kargil.*—Snow fell on seven days in March. There was no snowfall in the other two months. The accumulations on the surrounding high peaks were 9 ft., 4 ft. and *nil* respectively at the end of each of the three months. The falls during and the accumulations at the end of the period were considered to be about normal.

*Sonemarg.*—Snow fell on seventeen days in March and 2 days in April. Some of the falls during March were heavy. The snow when melted and measured amounted to 18.72" in March and 0.84" in April. There was no snowfall in May. The accumulations in Sonemarg proper were about 7 ft. at the end of March and *nil* at the end of April and May. On Zojilla pass, the accumulations were estimated to be 10 ft. and 3 ft. respectively at the end of March and April and *nil* at the end of May. The falls were above the average in March and below it in April and May. The accumulations were nearly normal in March and April and below the average in May.

*Gurez.*—There were five light snowfalls on the mountains. The accumulations were reported to be below normal.

*Leh.*—Snow fell on six days in March and three days in April to aggregate depths of 2½ inches and 3 inches respectively. In May snow fell up to a depth of 5 ft. on the hills and 3 ft. on the passes. The accumulations on the hills and passes at the end of each of the months were 6 ft., 4 ft. and 6 ft. respectively. The falls during and the accumulations at the end of the period were about normal. The snowline descended to heights of about 16,000 ft., 17,000 ft. and 16,000 ft. respectively at the end of each of the three months. The higher passes were not open to traffic during April.

*Muzaffarabad.*—The only information received shows that there were no accumulations of snow on the peaks by the end of May.

#### V.—THE PUNJAB.

*Rawalpindi.*—Snow fell on two days in March to a total depth of 20" at Murree. There was no snowfall in April and May.

*Chamba.*—Snow fell on the high peaks of Kalatop on 4 days in March to a total depth of 19 inches, and the snowline descended to 5,500 ft. on two occasions. There were practically no snow accumulations on the Chouri pass at the end of the month. No report was received for April. In May, except for a few light falls over the high peaks and passes above 10,000 ft. there was no snowfall. The accumulations at the end of May on the passes and peaks were estimated to be 4 to 6 ft. and were much below the normal.

*Kangra.*—Snow fell during March on the high peaks of the Himalaya mountains to a depth of 1 foot in the Kangra and Palampur tahsils and in the Kulu sub-division and to a depth of 2 to 4 ft. in the Seraj tahsil. Snow also fell to a height of half a foot at Naggar in the Kulu tahsil. Snowline descended to 5,000 ft. The accumulations at the end of the month on the higher passes of the Kulu sub-division varied from 1 foot to 14 ft. The snowfall during the month was reported to be below normal. In April also the falls were confined to

the high ranges and peaks. The depth of the falls were ¾ foot in the Kangra, Palampur, Kulu and Seraj tahsils. The accumulations at the end of April varied from ¼ foot to 10 ft. The falls were reported to be generally below normal. The falls during May on the high ranges of the Himalaya in Kangra and Palampur tahsils and Kulu subdivision amounted to about 1 foot. The accumulations of snow were about 2 ft. on the high peaks of the Himalayan ranges. There was no snow on the high passes of Palampur tahsil and Kulu subdivision. The falls during the month were reported to be below normal.

*Kilba (Simla District).*—Snow fell on nine occasions in March to a total depth of 2' 11" the snowline descending to 5,600 ft. In April and May falls occurred at higher elevations only, the snowline remaining at about 11,500 ft. All the passes were closed to traffic throughout the period, except the Rupin and Buran passes which were open during May.

#### VI.—THE UNITED PROVINCES.

*Almora.*—The following table gives the amount of falls during and the accumulations at the end of each of the months.

Locality.	March.	April.	May.
	Ft.	Ft.	Ft.
<i>Falls.</i>			
Malla Danpur . . . . .	3	4	3
Malla Darma . . . . .	1½	..	1
Chaudans . . . . .	10½	6½	5
Byans . . . . .	11	10	9½
Malla Johar . . . . .	3½	..	..
<i>Accumulations.</i>			
Pinder valley . . . . .	60	60	60
Nandakhat . . . . .	60	60	57
Sunder Dhunga . . . . .	60	60	57
Bankatia . . . . .	75	75	75
Masurleg . . . . .	15	10	8
Lipu . . . . .	12	9	9
Lampia . . . . .	20	13½	13½
Nubedhura . . . . .	27	..	21
Panjachuli . . . . .	..	32½	27½
Ghasling . . . . .	..	3½	1

The falls were normal in March and above normal in April and May. The accumulations were below normal at the end of March and above the average at the end of May.

*Garhwal.*—Snow fell on seven days in March, five days in April and on four days in May. The depth of the falls on the higher elevations varied from 2 inches to 3 ft. in March and 2 ft. to 3 ft. in May, the falls during April being very light. The accumulations on the well-known higher passes were about ½ foot in March and 1 to 2 ft. at the end of May. The falls were reported to be generally above normal during the whole period.

#### VII.—ASSAM.

*Kamrup.*—Some snow fell on the peaks Saitinla, Numg Dala Thomsangla, Redilla, Ningsala and Dongla. The falls and accumulations were reported to have been below the average.

*Balipara Frontier Tract.*—Snow began falling on the passes of Se la, Orka La, Punsum La and Riso La in the upper ranges

from the beginning of March and continued till the end of April. But the total amount was below 3 ft. in depth. The passes were open to traffic throughout the period.

### South-West Monsoon Period, June to September, 1946.

#### JUNE AND JULY.

##### I.—AFGHANISTAN.

There was no snowfall in Afghanistan during June and July. The mountain ranges and passes were clear of snow.

##### II.—BALUCHISTAN.

Quetta.—There was no snowfall in Quetta during the period nor were there any accumulations.

##### III.—NORTH-WEST FRONTIER PROVINCE.

Hazara.—The approximate depths of the falls during June and July and the accumulations at the end of July are given in the following table :—

Peaks.	Elevations.	Falls during June and July.	Accumulations at the end of July.
	Ft.	Ft. In.	Ft. In.
Kachh . . . . .	17,500	5 4	4 0
Mahli Burawai . . . . .	16,200	3 0	1 6
Khopra . . . . .	16,000	2 6	1 2
Kuro pass . . . . .	16,000	3 0	1 4
Raji Bhogi . . . . .	16,000	4 0	2 1
Bajnar . . . . .	16,000	5 4	3 6
Sarool . . . . .	15,000	1 0	0 6
Mahli Battal . . . . .	15,000	2 2	1 0
Shah Kharan . . . . .	15,000	3 2	1 6
Jamgaoh . . . . .	15,000	3 0	1 4
Mulki . . . . .	11,000	1 0	..
Mokra . . . . .	10,000	2 0	..

##### Dir, Swat and Chitral—

Chitral.—There was no snowfall during the two months. The accumulations at the end of the period were negligible.

Malakand.—No snowfall occurred during the period. The accumulations at the end of June and July are given below :—

Locality.	June.	July.
	Ft.	Ft.
Mankial . . . . .	5	4
Baskhar . . . . .	2	1½

The accumulations were below normal.

Khyber Agency.—There was no snowfall during June and July nor were there any accumulations on the mountain ranges and passes at the end of July.

Kurram.—No snowfall occurred during this period. There were practically no snow accumulations even on the 'Sikaram' peak. (16,000 ft.)

South Waziristan.—There was no snowfall during June and July.

##### IV.—KASHMIR.

Skardu.—There was no snowfall during this period. There

Sadiya Frontier Tract. There was no snowfall during the period.

were no snow accumulations either at the stations proper or on the surrounding peaks at the end of July.

Dras.—No snowfall occurred during June and July nor were there any accumulations on the surrounding hills at the end of the period.

Srinagar.—Four light falls of snow 1 to 2 inches in thickness occurred on the Pir Panjal mountain range, surrounding the Srinagar valley during the first fortnight of June. There was no snowfall during July. The accumulations on the surrounding Pir Panjal mountain range were about 6 to 9 inches. The falls as well as the accumulations were below normal in both the months.

Gulmarg.—Snow fell on three days during the first fortnight of June on the Affarwat and Handibal mountain ranges. There was no snowfall during the rest of the period. The falls were reported to be below normal during the period. Accumulations 1 to 1½ ft. in thickness existed on the surrounding mountain gorges at the end of June. At the end of July, however, only very thin layers of accumulations were reported to exist on some of the higher peaks and gorges of the Affarwat and Handibal mountains.

Kargil.—There was no snowfall during the period. As usual, a little snow existed on the mountain peaks at the end of the period.

Sonemarg.—No snow fell during the period either at Sonemarg or on the surrounding ranges. There were no snow accumulations on the surrounding mountains and passes.

Leh.—No snowfall occurred during this period. The snowline remained at 18,000 ft. in June and 20,000 ft. in July. There were no accumulations of snow on the high passes which were open to traffic from the middle of June.

##### V.—THE PUNJAB.

Rawalpindi.—There was no snowfall during the period.

Chamba.—Snow fell on higher peaks above 13,000 ft. during the period. Accumulations were confined to elevations above 15,000 ft. and were below normal.

Kangra.—No snowfall occurred in Dharmasala during the period. In Kulu a little snow fell above 13,000 ft. The accumulations were reported to be below normal.

Kilba Hills.—There was no snowfall during the period. All the passes were open for traffic. The snowline was at a height of 11,500 ft. in June and 13,800 ft. in July.

##### VI.—THE UNITED PROVINCES.

Almora.—The following table gives the aggregate falls during and the accumulations at the end of June and July on the well-known passes and peaks. The snowfalls during and the accumulations at the end of the period were reported to be generally above normal.

Locality.	June.	July.
	Ft.	Ft.
<i>Falls.</i>		
Malla Danpur . . . . .	2	2
Malla Darma . . . . .	..	3
Chaudans . . . . .	5	5½
Byans . . . . .	7½	8½
Malla Johar . . . . .	..	..
<i>Accumulations.</i>		
Pindar Valley . . . . .	60	60
Nandakhat . . . . .	55	57½
Sunder Dhunga . . . . .	60	60
Bankatia . . . . .	75	75
Masurleg . . . . .	7	5
Lipu . . . . .	10	7
Lampia . . . . .	15	10½
Nubedhura . . . . .	..	15

*Garhwal.*—No snow fell during the period. The accumulations of snow, on the mountain ranges, were reported to be below normal.

## AUGUST AND SEPTEMBER.

### I.—AFGHANISTAN.

*Kabul.*—No information has been received.

### II.—BALUCHISTAN.

*Quetta.*—There was no snowfall during the period.

### III.—NORTH-WEST FRONTIER PROVINCE.

*Malakand.*—There were no snowfalls during the period. The accumulations on the well-known peaks are given below and they were below normal.

Locality.	August.	September.
	Ft.	Ft.
Bashkar . . . . .	4	1
Mankial . . . . .	1½	2

### IV.—KASHMIR.

*Skardu.*—There was no snowfall in August. In September there was no snowfall at the station proper but three light falls occurred on the surrounding high passes and the snowline descended to about 11,000 ft. There were no accumulations either at the station proper or on the surrounding passes at the end of the period. Conditions were nearly normal.

*Dras.*—No report was received for August. No snowfall occurred during September nor were there any accumulations at the end of the month.

## The Retreating Monsoon Period, October to December.

### I.—AFGHANISTAN.

*Kabul.*—Light falls of snow were observed on the peaks of the Hindukush (14,000 ft.) and Paghman (8,000 ft.) ranges on two days in November and on two days up to the 17th of

*Srinagar.*—There was no snowfall during August. In September, however, one light fall, about an inch in depth, was observed on the Affarwat range. The amount of snowfall was below the average. The accumulations on the surrounding Pir Panjal mountain were reported to be below normal at the end of August and *nil* at the end of September.

*Gulmarg.*—There was no snowfall in August. A light fall occurred on the Affarwat and Handibal mountain ranges on the 2nd of September. The fall was reported to be below normal. There were thin layers of accumulations at the end of the period on some higher peaks and in the gorges of the Affarwat and Handibal mountains.

*Kargil.*—There were neither falls of snow nor any accumulations.

*Sonemarg.*—No snow fell during the period.

*Leh.*—No snow fell during the period. There were very little accumulations on the well-known peaks at the end of September.

### V.—THE PUNJAB.

*Rawalpindi.*—There was no snowfall during the period.

*Kilba.*—Snow fell on the higher peaks once in August and on a few occasions in September. The snowline descended to 15,600 ft. in both the months. The snowfall during the period was reported to be below normal. All the passes were open to traffic in both the months.

### VI.—THE UNITED PROVINCES.

*Almora.*—The falls and accumulations of snow during August are given in the table below. The falls during and the accumulations at the end of the month were above normal and about normal respectively. No report has been received for September.

Locality.	August.
	Ft.
<i>Falls.</i>	
Malla Darma . . . . .	14
Chaudans . . . . .	6½
Byans at Limpo . . . . .	5½
Byans at Lampiya . . . . .	8½
<i>Accumulations.</i>	
Masurleg . . . . .	6
Lipu . . . . .	7
Lampia . . . . .	10½
Nubedhura . . . . .	15

*Garhwal.*—There was no snowfall during the period.

December. In Kabul proper, the first snowfall occurred on the 18th December which melted away by the next day. It snowed again on the 20th. A thin layer of snow was seen on the surrounding hills of Kabul. The snowfall was reported to be below normal.



## II.—BALUCHISTAN.

*Quetta.*—There was no snowfall in Quetta proper but it fell on almost all the peaks of the surrounding mountains on three days in December. There were no accumulations of snow at the end of the period.

## III.—NORTH-WEST FRONTIER PROVINCE.

*Hazara.*—Reports for October and November were not received. The falls during and accumulations at the end of December are given below. The falls and accumulations were slightly above normal.

Locality.	Falls.	Accumulations.
	Ft. In.	Ft. In.
Thandiani (8,800 ft.)	4 10	4 6
Birangali (6,600 ft.)	1 9	1 0
Dungagali (8,000 ft.)	1 4	1 4
Kalabagh (7,900 ft.)	1 4	1 4
Narang (8,000 ft.)	5 3	5 3
Pludran (7,500 ft.)	3 6	3 6
Kagan (7,000 ft.)	3 0	3 0
Jared (5,000 ft.)	0 4	0 4
Sundi	5 4	2 6
Kund	5 11	2 6
Dagri	5 4	6 0
Sattu	4 0	4 0
Malkandi	1 6	1 6
Jachha	5 6	2 6
Kachh (17,500 ft.)	..	5 4
Mahli Burawai (16,200 ft.)	..	3 0
Khopra (16,000 ft.)	..	2 6
Kuropass (16,000 ft.)	..	4 0
Raji Bhoji (16,000 ft.)	..	2 6
Mahli Battal (15,000 ft.)	..	2 0
Sarool (15,000 ft.)	..	2 6
Bajtar (16,000 ft.)	..	4 0
Shalgram (15,000 ft.)	..	3 0
Jamgarh (15,000 ft.)	..	2 0
Masala Musa (13,300 ft.)	..	2 0
Mulki (11,000 ft.)	..	2 0
Makra (10,000 ft.)	..	2 0
Miranjani (19,000 ft.)	..	4 0
Machi Puri (9,500 ft.)	..	2 0
Machi Dhara	..	2 0
Nathia Gali	..	1 0
Baragali	..	1 0
Changalagali (7,000 ft.)	..	1 0

*Drosh.*—There was fairly good snowfall on the surrounding peaks, the Lowarai and Madaglasht peaks being covered with snow right from the beginning of the month. At the station proper light falls occurred on five days which when melted measured 0.84 in. The accumulations of snow on the Lowarai pass at the end of December were 3 to 4 ft.

*Malakand.*—No report was received for October. Two falls occurred during the last week of November to total depth of 5 ft. on the Lowarai top. The accumulations at the end of November on the Bashkar and Mankial peaks were 4 ft. and 2 ft. respectively. During December snowfall occurred as follows:—

	Ft.
Lowarai	6
Bashkar	7
Mankial	7½
Ilam and Dosara	6

Snowfall was about the average in November and a little below the average in December.

*Kurram.*—Snow fell on three days in December to a total depth of 4½".

## IV.—KASHMIR.

*Skardu.*—No snowfall occurred at the station proper during October, but there was one light fall on the surrounding high peaks. It snowed on two days in November and five days in December at Skardu. The snow when melted and measured as water amounted to 10 and 14 cents respectively in the two months. On the surrounding mountains snow fell to depths of more than two feet in November and more than four feet in December. The accumulations at the station and on the surrounding hills are given below:—

	October.	November.	December.
Skardu	Nil	4 in.	5 in.
Surrounding mountains	Nil	2 ft.	..
Surrounding passes	..	..	4 ft.

The falls during November and December were reported to be above normal.

*Dras.*—Snow fell on the peaks of the surrounding mountains and on the Zojilla pass during October. At the end of the month there were no accumulations at the station proper while about three inches of snow were left on the Zojilla pass. One heavy fall of snow was experienced on the 29th November in and around Dras. The depth of the fall was about 3 ft. at Dras, 1 ft. at Kargil and 4½ ft. on the Zojilla pass, which became closed to traffic. Snowfall was reported to be above normal during the month. In December it snowed on 13 days. The total depth of the falls was about 8 ft. at Dras and 9 ft. on the Zojilla pass and these were left as accumulations at the end of the month. The falls during the month were reported to be above the average. The accumulations were reported to be below normal at the end of October and above it at the end of November and December.

*Srinagar.*—Three light to moderate falls of snow of thickness varying from ½" to 2" occurred on the Pir Panjal mountain range in October. Three widespread, moderate to heavy falls during the last three days of November and eleven falls during December, were observed on the same mountains and in the Srinagar valley. The depth of the falls varied from 3 to 4 ft. on the mountains and 6 in. to 1½ ft. in the valley during November. The accumulations of snow on the surrounding Pir Panjal ranges were reported to be 4 ft. to 5 ft. at the end of November and 6 ft. to 9 ft. at the end of December. The falls and accumulations were below normal during October and above normal during November and December.

*Kargil.*—There was no snowfall during October. Snow to a depth of 10" fell on one day at the end of November and this was reported to be above the average. During December snow fell on six days and when melted and measured as water amounted to 2.72". The total depth of snow on the mountain peaks was 9 ft. and on the ground 1½ ft. The falls and accumulations were above the average.

*Sonemarg.*—There was one snowfall in October and the depth of snow was 3.5 in. It snowed on two days in November and five days in December. The total depth of snow was 6.60 in. in November and 5 ft. 4 in. in December. The

accumulations at the end of each month at Sonemarg proper and on the Zojilla mountains are given below :—

	Accumulations at the end of		
	October.	November.	December.
Sonemarg . . . . .	Nil	Ft. 5½	Ft. 7
Zojilla pass . . . . .	5 in.	8	10

The falls and accumulations were reported to be below the average during October and above the average during November and December.

*Leh.*—There was a light snowfall on the mountain summits in October. Snow had accumulated to about one foot on the high passes at the end of the month. During the last week of November it snowed heavily on the mountain summits and the snowline descended to a height of 11,500 ft. The accumulations at the end of the month on higher passes were three to four feet. During the second half of December snow fell on the mountain tops on many days and in Leh proper on six days. The snowline descended to a height of 11,000 ft. The accumulations on the high passes amounted to five feet at the end of the month. The snowfall was said to be normal during the period.

#### V.—THE PUNJAB.

*Rawalpindi.*—Snow fell in Murree on one day in November to a depth of 6 in. and on five days in December to a total depth of 17 in. These were reported to be below the average.

*Chamba.*—No report was received for October. Three falls of snow to a total depth of 11 inches occurred on the Bharmour range during the last week of November. The snowline descended to 6,000 ft. The accumulations at Bharmour amounted to 11 inches at the end of the month. At Kilar in the Pangi Ranges and at Bharmour snowfall occurred on nine days and 6 days respectively during December to total depths of 3 ft. and 4 ft. 11 in. The snowline descended to a height of 3,000 ft. on the Bharmour range. The accumulations at the end of the month on Bharmour range at a height of about 8,000 ft. were nearly 8 ft. and at Kilar (8,400 ft.) 1 ft. 2 in. The falls and accumulations were above the average. However, the falls were reported to be above normal on both the ranges. At Chamba proper snow fell on four days in December to a total depth of 3 ft. 7 in. The accumulations on Khara Danda pass (9,000 ft.) were 4½ ft. at the end of the month.

*Kulu (Kangra District).*—No report was received for October. The following table gives the snowfall at various places during November and December and the accumulations at the end of the period.

Locality.	Falls.	Accumulations.
	Ft.	Ft.
Hampta pass (14,000 ft.) . . . . .	10	9
Rohtang pass (13,000 ft.) . . . . .	9	8
Barshai . . . . .	8	6
Bojharhar . . . . .	9	7
Chandarkhani pass (12,000 ft.) . . . . .	6	5
Loteryachari . . . . .	7	5
Sari . . . . .	6	4½
Bhobo . . . . .	6½	5
Bishmari . . . . .	5½	4
Bhajang . . . . .	5	3
Jalaori pass . . . . .	..	3
Bishleu pass . . . . .	..	3

The snowfall was reported to be normal during the period.

*Kilba (Simla District).*—It snowed at higher elevations during October, the snowline coming down to 9,800 ft. The snow melted away soon. In November the weather remained dry up to the middle of the third week after which snow fell above 6,900 ft. In December also snow fell at higher elevations the snowline descending to 6,500 ft. The depth of snow at a height of 8,500 ft. was 1 ft. All the passes remained unpassable from the third week of November. The snowfall was reported to be below the average.

#### VI.—THE UNITED PROVINCES.

*Almora.*—No report was received for October. The falls and accumulations at various localities in November and December are given in the following table. The falls and accumulations were generally above normal.

Locality.	November.	December.
	Ft.	Ft.
<i>Falls.</i>		
Malla Danpur . . . . .	4	3½
Malla Darma . . . . .	½	½
Chaudans . . . . .	3½	4
Byans at Lampiya . . . . .	5	4½
Byans at Lipu . . . . .	3½	3
Malla Johar . . . . .	..	2
<i>Accumulations.</i>		
Pindar Ghati . . . . .	22½	17½
Pindar Top . . . . .	45	27½
Nanda Khat . . . . .	52½	32½
Sundarhunga Ghati . . . . .	57½	37½
Sundarhunga Top . . . . .	65	32½
Bankatta . . . . .	..	13½
Masurleg . . . . .	13	10
Lipu . . . . .	12	11
Lampia . . . . .	17	15
Nubedhura . . . . .	17	17
Bashakatiya Top . . . . .	13½	..
Kantela Hill . . . . .	3½	2½
Kantela Ghati . . . . .	7	4½
Kafni Hill . . . . .	6	6½
Kafni Ghati . . . . .	9	10

*Garhwal.*—No snowfall occurred during October. There were two falls in November and two in December. The depth of the falls at higher altitudes was 2 ft. in November and ½ to 1 foot in December. Snowline descended to a height of 6,000 ft. during December. The falls during the period were reported to be below the average.

## VII.—ASSAM.

*Balipara Frontier Tract.*—There was no snowfall in the lower ranges of the Balipara Frontier Tract during the period. A little snow fell on the upper hills like Se La and Me La

towards the end of December and this was reported to be below the average.

*Sadiya Frontier Tract.*—The reports received show that very little snow fell during the period.

**Summary.**

*Cold Weather period, January and February.*—Snowfall during and the accumulations at the end of the period were generally below normal throughout the mountain regions to the north and northwest of India.

*Hot Weather period, March to May.*—The falls and the accumulations were generally below the average except in Kashmir where they were about normal, and in the United Provinces where they were slightly above the average.

*Southwest Monsoon period, June and July.*—Snowfall during this period was as usual, confined to higher elevations and the accumulations were negligible.

*Southwest Monsoon period, August and September.*—There was no snowfall except at isolated localities in Kashmir, the Punjab and the United Provinces and these were below the average. The accumulations that existed at the end of the period were negligible and below the average.

*Retreating Monsoon period, October to December.*—The falls were above the average in Kashmir, very nearly the average in North-West Frontier Province, the Punjab and the United Provinces and less than the average elsewhere. The accumulations of snow were however generally above the average except in Afghanistan, Baluchistan and Assam where there were very little of accumulations.